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###### COURSE SYLLABUS

###### Semester: SUMMER Year: 2013

**Mission Statement:**

Richard J. Daley College provides high-quality education which leads to academic success, career development, and personal enrichment that fulfill diverse community needs.

###### Course (Discipline): Manufacturing Technology Number: 295 Section: IAI#:

**Course Title:** Electric Motor Controls **Length of Course (Weeks):** 16

**Credit Hours:** 3 **Lecture Hours:** 1 **Lab Hours:** 4 **Contact Hours:** 5

**Meeting Day(s):**       **Times:**       **Building:**       **Classroom #:**

**Syllabus can be found on Blackboard website at** [**https://ccc.blackboard.com/webapps/login/**](https://ccc.blackboard.com/webapps/login/)**.**

###### Dean, College to Careers in Advanced Manufacturing \_\_Ray Prendergast\_\_\_\_\_\_\_

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#### Office hours:

**Course Description**:

This course is a study of different types of electrical motor controls as they are applied to industrial circuits. Topics include safety issues, instrumentation, and the interpretation of line diagrams. An overview of the different types of motor controls is also provided. The students will be able to troubleshoot and repair problems associated with different motor control applications of the industry. Writing assignments, as appropriate to the discipline, are part of the course.

**Course Prerequisites**:

Grade of C or better in 340MFGT 191, or Consent of Department Chairperson.

**Students Course is Expected to Serve:**

Students in the manufacturing program who are also interested in Factory Automation and students in engineering interested in factory automation.

**Course Objectives:**

1. Understand and practice safety procedures such as lock-out and tag-out.
2. Understand the methods for starting, accelerating, and decelerating a motor.
3. Understand the differences between manual motor starters and magnetic motor starters. and the function of magnetic overload protection.
4. Understand the function and application of servo-motor control, variable frequency motor control.
5. Understand different motor control preventative maintenance and troubleshooting techniques.

**Student Learning Outcomes:**

**After successful competition of the course, the student will be able to:**

1. Identify components on line diagrams.
2. Interpret components on line diagrams.
3. Select thermal overload elements for different motor starters.
4. Select the motor starter size depending on the motor and environment.
5. Start, accelerate, and decelerate an electric motor that powers and completes an industrial task (e.g. fills a bottle with the correct amount), using the appropriate motor controls.
6. Differentiate power distribution systems.

**Recommended Texts and Course Materials:**

Rockis, G., and Mazur, G. (2009). *Electrical Motor Controls for Integrated Systems, 4th Edition*. Orland Park, IL: American Technical Publications. ISBN: 978-0826912183

Alerch, W.N., and Herman, S.L. (2006). *Electrical Motor Control, 8th Edition*. Independence, KY: Delmar Cengage Learning . ISBN: 978-1418028701.

***Materials:***

Amatrol Electric Motor Controls trainers.

**Recommended Methods of Instruction**:

The methods of instruction will include:

Lecture, classroom discussion, small group work in lab, and project-based learning.

**Recommended Methods of Evaluation:**

Midterm and final course grades will be based on the following evaluation methods:

Class Participation

Lab and Class Projects

Midterm examination

Final examination

Attendance

Grading Scale:

90-100% = A

80-89 = B

70-79 = C

60-69 = D

Below 60 = F

See the Policy on grade designations and grade appeals at:

<http://www.ccc.edu/colleges/daley/departments/Pages/Grade-Appeal-Policy-and-Procedure.aspx>

**NOTE:** Type or copy and paste the link above into a web browser to view its content.

### Topical Outline / Course Calendar:

**Week Topic**

1. Electrical Tools, Instruments, and Safety
2. Logic Applied to Line Diagrams
3. AC Manual Concentrators and Motor Starters
4. Magnetism and Magnetic Solenoids
5. AC/ DC Contractors and Motor Starters
6. Time Delay and Logic
7. Control Devices
8. Mid Term Examination
9. Reversing Motor Circuits
10. Power Distribution Systems
11. Solid-State Electric Control Devices Photoelectric and Proximity Controls
12. Reduced Voltage Starting Accelerating and Decelerating Methods
13. Introduction to Servo Motor Control
14. Introduction to Variable Frequency Motor Control
15. Preventive Maintenance and Troubleshooting
16. Final Examination

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